eXtreme4s

User Manual

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Contents

Safety Instructions

To prevent damage to your iView Data product or injury to personnel operating the equipment, please read the following safety precautions prior to operation. These instructions should be made available to all those who will use and operate iView Data products.

Power Supply

All iView products require a mains power supply. This power supply must be disconnected when equipment is being upgraded or relocated.

Cables

Do not expose cables to any liquids; doing so may cause a short circuit which could damage the equipment. Do not place heavy objects on top of any cables as this can cause damage and possibly lead to exposed live wires.

Ventilation

All computer equipment should be located in a well ventilated area. All ventilation holes on the computer casing must be kept clear of any obstruction at all times. Failure to do so will result in the system over heating and damaging your equipment.

Working Environment

The equipment should be located in an environment free from dust, moisture and extreme changes in temperature and should be placed on a stable and solid work surface. Liquids (hot/cold drinks etc) should not be placed near the equipment as spillage could cause serious damage.

Gas/Flammable Liquids

Electronic equipment should never be used in the presence of gas or any flammable liquid, doing so could result in an explosion or serious fire.

Smoke/Unusual Smells

Should you notice smoke or unusual smells being emitted from your computer, turn off and unplug the system from the mains supply. The system should then be passed to a qualified technician for inspection. Continued operation could result in personal injury and damage to property.

Maintenance

Maintenance should only be carried out by competent technicians, any iView plug-in cards that are physically damaged should be returned to us for repair using iView RMA procedures.

Disposal

At the end of life all iView products should be disposed of as per local laws and regulations dictate. In UK contact iView to arrange disposal. Our WEE registration number is WEEE/AA0005ZR.

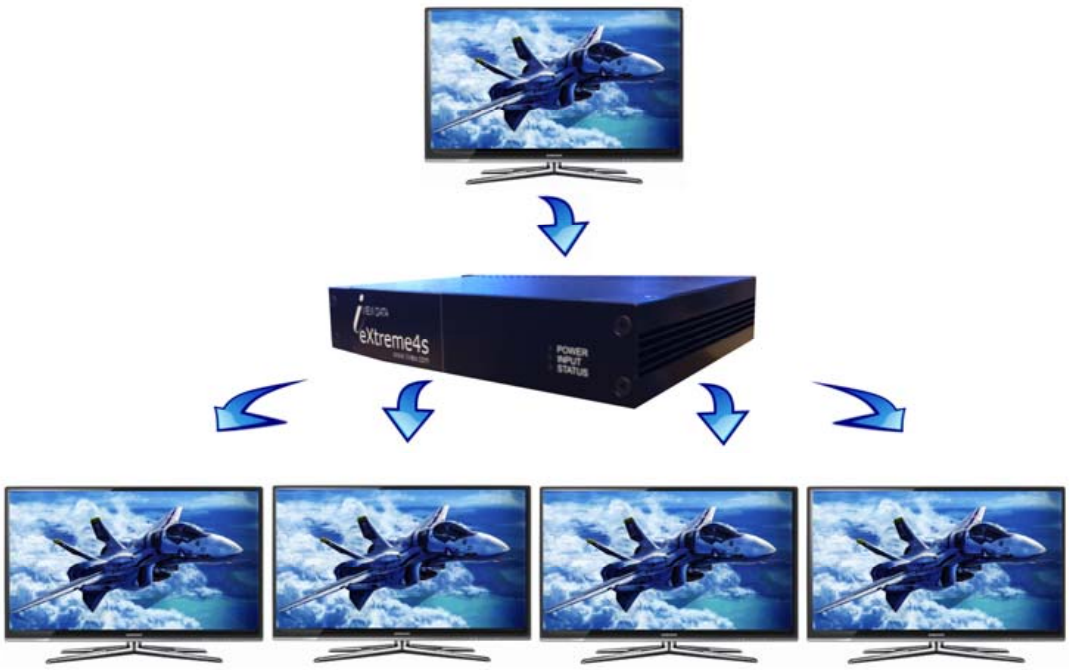
Introduction

The iView eXtreme4s is a stand alone display wall controller that accepts a standard single or dual-link DVI input and can flexibly display this across four output monitors.

Each output can be driven as DVI or analog RGB, and can represent an arbitrary crop region of the original input image. The output resolution and frame rate does not need to be related to that of the input as the eXtreme4s will optionally upscale and frame-rate convert each cropped region independently. However, if the eXtreme4s detects that frame rates identically match it will automatically genlock. Additionally, each output can be independently mirrored or rotated through 90°, 180° or 270° to support creative mixes of landscape and portrait monitors.

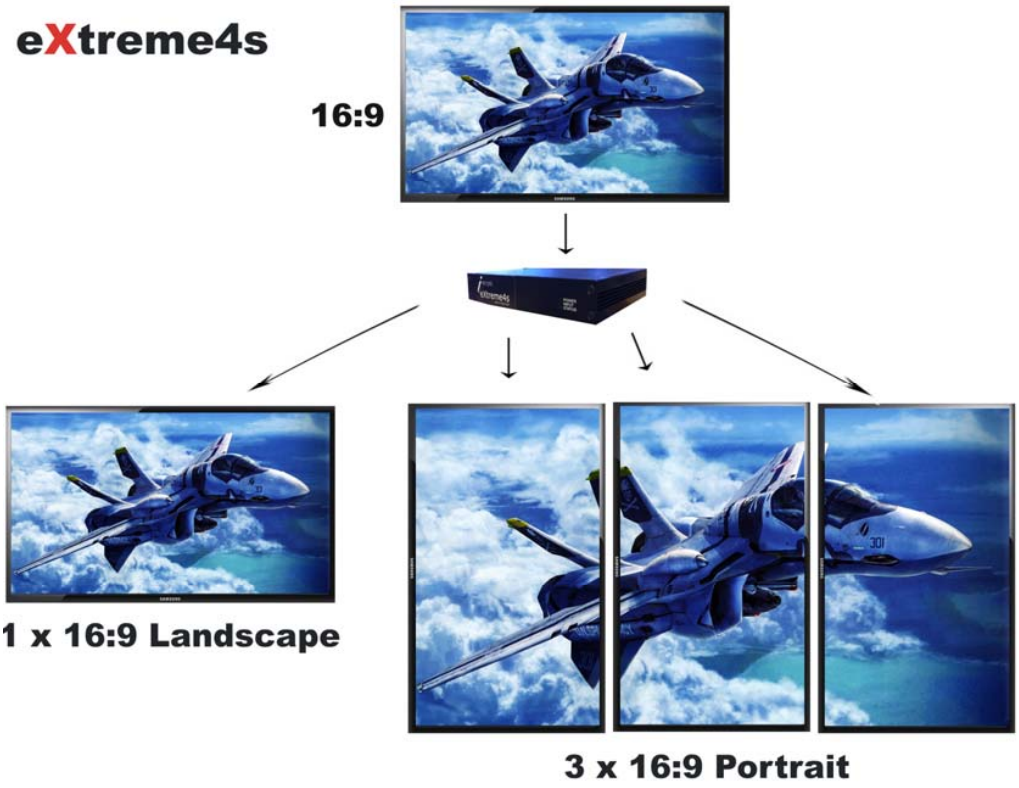
Configuration Examples

Listed on the next few pages are just a few examples of what can be achieved with the eXtreme4s. The list of examples is not definative and users are encouraged to experiment with different display orientations.

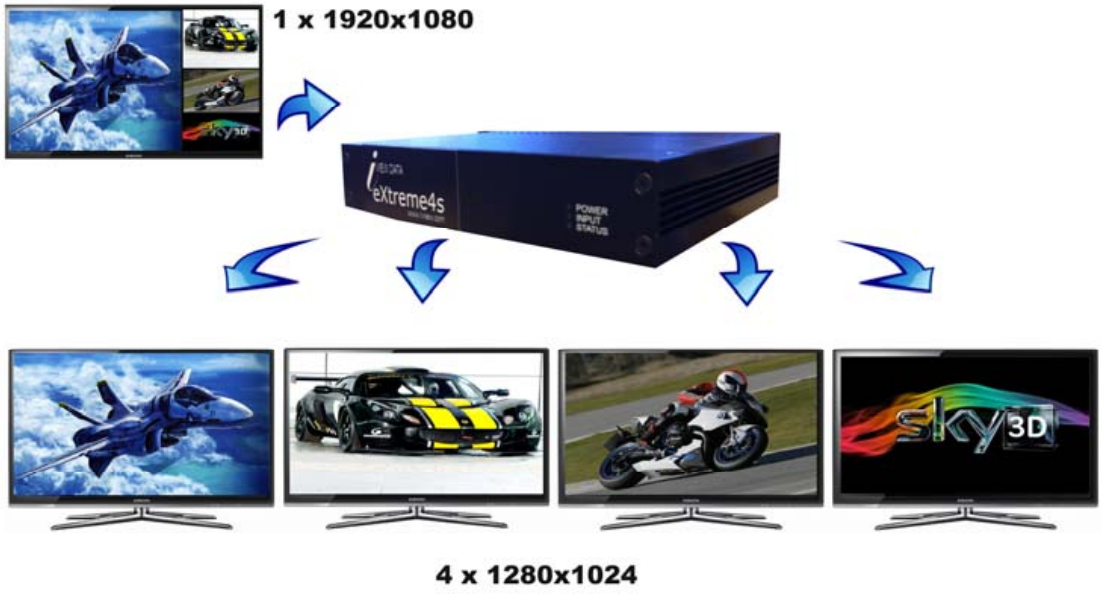


Duplicate the input signal x 4 and displays each duplicate on separate screens

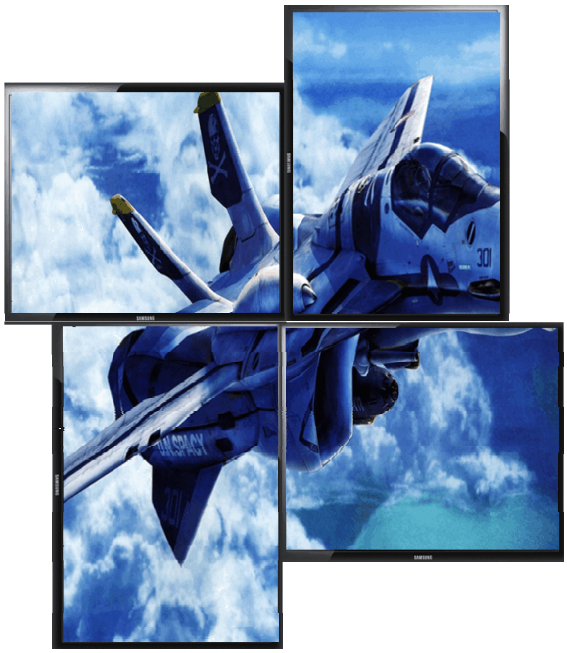
Divide the input signal into quadrants and display each quarter on separate displays with optional frame rate conversion (in this case 30Hz to 60Hz). Crop regions can be adjusted to provide monitor bezel compensation.



Duplicate the input signal x2 and display 1 on a single landscape display and divide the 2nd into thirds, rotate to portrait, upscale and split between 3 displays.



Crop input signal, upscale specific areas and display on 4 separate screens.



Crop the input signal into eXtreme4s and display x2 quarters landscape and x2 quarters portrait.

Crop the input signal eXtreme4s rotate through 90º,180º or 270º, display in landscape and portrait. Arbitrary crop regions can allow the monitors to be artistically arranged, but maintain an undistorted image.

Unpacking

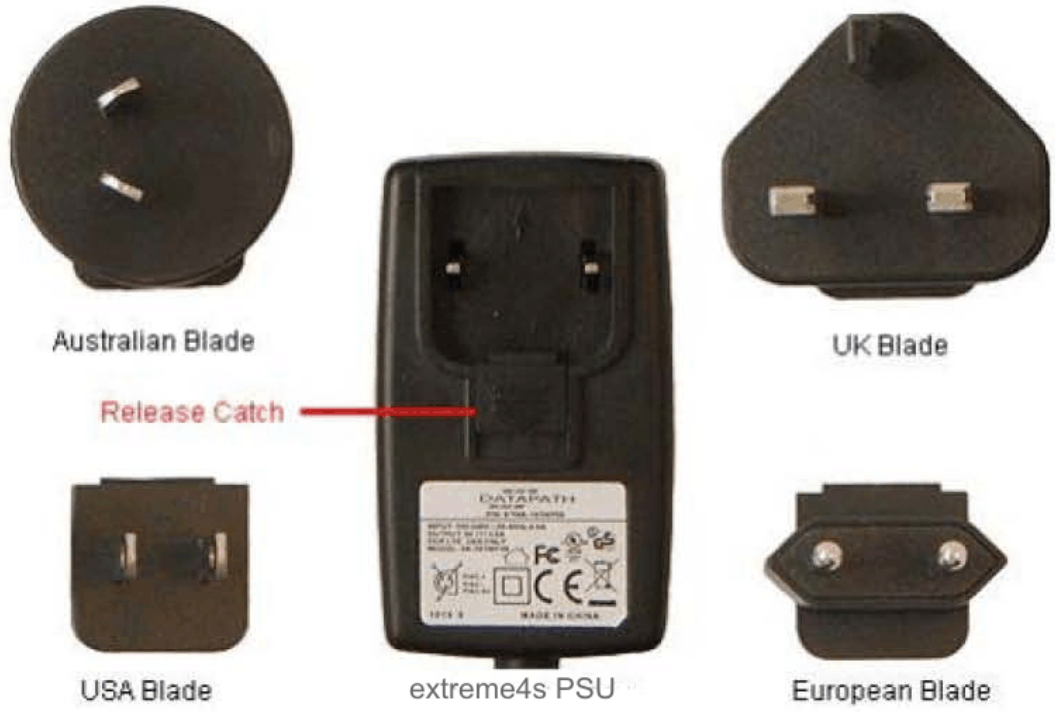
Your packing box should contain the following items:

- The eXtreme4s Display Wall Controller.
- The eXtreme4s-PSU Power supply unit with international blades.
- USB 2.0 cable Type A to Type B.
- iView CD containing Configuration Application and User Manual.

Note:

We recommend that you do not discard the packing box until you are completely satisfied with the eXtreme4s, and it is fully installed and working correctly. We also recommend that you make note of the serial number of the controller in a prominent place before you connect it to the computer. This should hasten any query should you need to contact our Technical Support Department. The serial number is displayed on the eXtreme4s and the box label.

Fitting the eXtreme4s PSU Blades



Select the appropriate blade for use, place the top edge of the blade into the recess of the PSU and the press down ensuring the Release Catch clicks firmly into place and secures the blade inside the recess.

To remove the blade, slide the Release Catch down fully and pull the blade away from the PSU recess.

Description

Front Panel

Operation Indicators

The front panel has three LED's to indicate the operational status of the eXtreme4s:

- Power.
- Input.
- Status

Power

- When illuminated, the Power LED indicates the eXtreme4s is connected to a mains supply using the supplied PSU.

Input

- When illuminated, the Input LED indicates a valid DVI source is connected.

Status

- Continuous illumination – Indicates the eXtreme4s is operating normally.
- Flashing – Unit is operating over the normal operating temperature. Ensure the input fan vent is not blocked.
- If the Status LED goes off and remains off this indicates that the settings configured in the eXtreme4s application no longer match the input, this is normally the result of a change of input. The eXtreme4s will compensate for the settings and reconfigure itself to display as near to the settings as possible. The output will still be displayed but not necessarily as expected.

When the eXtreme4s device is connected to a PC by a USB cable, and the eXtreme4s Control application is active, then all three lights flash in turn to help to identify which unit is being controlled.

Rear Panel

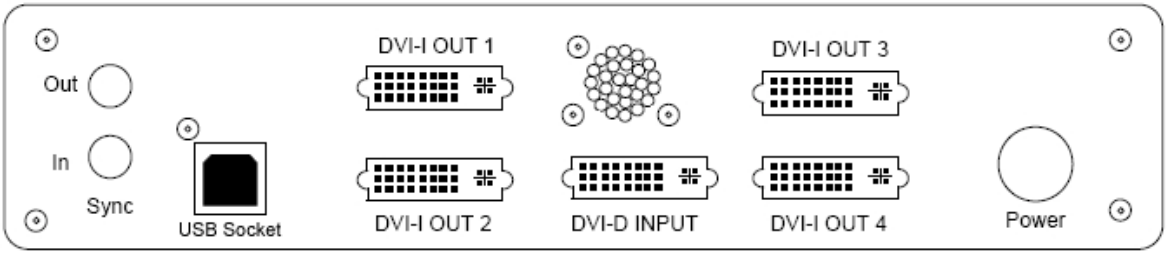


Fig. 2

Sync Sockets

The Sync sockets are provided for future genlock enhancements. They should be left unconnected.

USB Socket

The USB socket is used to connect the eXtreme4s to a PC via a USB connection using the supplied USB Type A to Type B cable. Configuration of the eXtreme4s is programmable via an application utility allowing easy control of cropping, scaling, rotation and gaps.

DVI-D Input Socket

The DVI-D Input socket is used to connect the DVI input source to the eXtreme4s. The eXtreme4s supports Dual Link DVI, Single Link DVI and also HDMI (not HDCP compliant) by using the optional DVI/HDMI Adapter.

DVI-I Output Sockets

The four DVI-I Out sockets are used to connect the eXtreme4s to the output monitors. The eXtreme4s supports both DVI and analog RGB monitors.

Power

The Power socket is where the power source is connected to the eXtreme4s. The eXtreme4s -PSU supplied is plugged into the Power socket. The power LED on the front of the eXtreme4s illuminates when a power supply is connected.

Setting up the eXtreme4s

- Ensure the power supply for the DVI source is disconnected.
- Connect the cable from the DVI source to the input socket on the rear of the eXtreme4s.
- Connect the four displays to the output sockets on the rear panel of the eXtreme4s.
- Connect the eXtreme4s-PSU to the eXtreme4s and switch on the power supply at the mains socket using the correct international blade (see page 9).
- Power up the DVI source.

The Power LED located on the front panel will illuminate to indicate that power has successfully been applied to the unit.

The eXtreme4s incorporates an internal processor that will continuously monitor the received DVI signal, and whenever a valid and stable input is detected the Input LED is illuminated. If the Input LED is not illuminated, the eXtreme4s cannot detect a valid DVI input source.

During operation, the eXtreme4s is able to adjust its internal operation to maintain the programmed output proportions even when the input resolution changes.

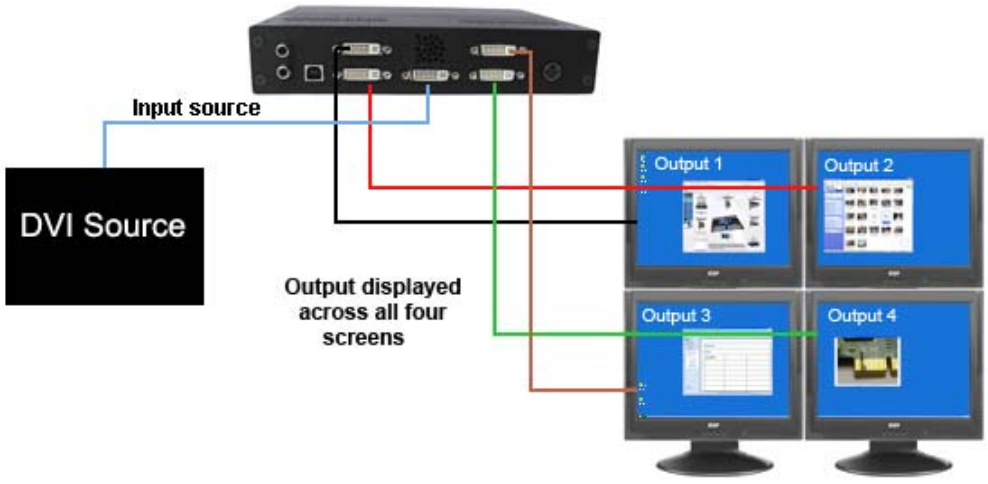


Fig. 3

Configuring the eXtreme4s

Factory Default Settings

The eXtreme4s stores a number of parameters to configure its operation. This allows it to operate stand alone in a very flexible manner. The configurations affect the input and output display modes as well as the required partitioning of the input image between monitors.

By default the eXtreme4s is configured as follows:

Input EDID Preferred Mode:	1920 x 1080 x 60Hz (SMPTE timings)
Output monitor mode:	Use Monitor Preferred Mode
	Default : 1920 x 1080 x 60Hz (SMPTE)
Cropping Mode:	2x2 equal split (960x540)
	No Rotation

The default settings are changed using the Windows® application provided, which can be run on any Windows® platform and connected to the eXtreme4s via the supplied USB cable. A description of the use of the application is provided in the eXtreme4s Control Application section.

The sections below describe the settings that are possible and why they may be needed. For details on how to program the eXtreme4s hardware with your desired configurations, please see the eXtreme4s Control Application section.

Configuring DVI Input resolution

Because the timings and resolution of the DVI input are set by the DVI source machine, the eXtreme4s can only configure this indirectly by presenting a programmable “Preferred Mode” as part of its EDID (Extended Display Identification Data).

Most graphics cards and HDMI appliances automatically select the “Preferred Mode” resolution and timings presented by the eXtreme4s EDID, but they may need to be forced to re-detect if the EDID contents are changed by the eXtreme4s application. This would typically be via a hot-plug event caused by disconnecting and reconnecting the DVI input cable.

The configuration application will allow readback of the resolution that is currently being detected, as well as the ability to read and write the internal EDID rom.

Monitor Outputs

The eXtreme4s can be configured to read the corresponding EDID of each monitor that is connected and to drive out a signal that corresponds to the resolution, timings and mode (RGB or DVI) of the Preferred Mode. This is the factory default configuration.

Please note that when different monitors are attached to the four outputs, each may advertise a different Preferred Mode, therefore each output will be driven at a different mode.

Whenever the monitor EDID is used, the eXtreme4s will calculate the internal scale factors to ensure that the monitor (at whatever resolution it is being driven) will still display the correct proportion of the input image.

If an EDID cannot be read (for example if the monitor cable does not support the DDC signals required), there is a default mode that can be programmed into the eXtreme4s’s memory. This is factory configured to 1080p.

In some cases it may be that the user requires a very specific output timing (for example when genlocking to the input) irrespective of the monitor EDIDs. In this case the eXtreme4s can be configured to always output the mode that has been programmed as the default mode.

Selecting the Regions to Be Displayed

Each output of the eXtreme4s can take its display data from any arbitrary rectangular region of the captured input image. The factory default for these cropping rectangles configures the four monitors to display a quarter of the input as a 2x2 array, and these proportions are maintained across different input resolutions.

For a 1080p input, this means that 960x540 pixels from the input image would be upscaled by a factor of 2 in each direction if the selected output resolution was 1080p.

However if the input resolution were to change to 1600x1200, then for the same output monitor the eXtreme4s would upscale from an 800x600 region and would reprogram its scale factors to 2.4 horizontally and 1.8 vertically to support the same 1080p monitor.

The cropping regions can be assigned aribitrarily and can overlap, the only restriction being that the resulting scale factor must be greater than 1.0 (ie 1:1 or upscaled) in either direction. As an example it is possible to use eXtreme4s to output four identical copies of the input signal (providing the resulting output timings remain within the capabilities of the single-link DVI outputs).

The regions of the input image to be displayed on a given output monitor can be programmed via USB by using the iView configuration application.

In order to support portrait orientation of monitors, the source data can be rotated by 90º, 180º or 270º as it is output to the monitor.

Operating Instructions

DVI Input

When the eXtreme4s is powered up successfully and the Power, Input and Status LED indicators are illuminated, this indicates that a DVI input mode has been detected and is working normally.

If the Input LED indicator is not on, check to ensure a single or dual link DVI cable is correctly fitted to the appropriate sockets.

Once the LED indicators are illuminated, the eXtreme4s will display the source across all four screens according to the configuration that is stored in its non-volatile memory. The eXtreme4s is factory configured to display the input image as a 2x2 split as shown in ***Fig.3***.

Output

To connect to an analog output, a DVI-I-VGA cables are required. To connect to a DVI output, a DVI-D cable is required.

Configuring the eXtreme4s

The eXtreme4s has a USB port to allow a host PC to connect to the eXtreme4s box and for the user to program its configuration. Once configured the eXtreme4s will run stand-alone without the need for the USB connection and will auto detect input resolutions and adjust internal scaling to drive the output monitors consistently.

Genlock

The Firmware running on the eXtreme4s will detect when input and/or output timings are set to identical frame rates and will automatically genlock the syncs in these cases. In all genlock modes, the timings are configured to share a common reference clock, so there will be no drift in synchronisation, and therefore no requirement for continual adjustment which can sometimes upset LCD panels. The genlock status is shown in the eXtreme4s Control Application.

eXtreme4s Control Application

Application Installation

Note: Do not plug the e Xtreme4s **into a USB port until the driver installation is complete.**

Locate the Install folder on the iView CD supplied with the eXtreme4s, run `install.exe.` and follow the installation wizard. During installation a warning message is displayed stating that the driver does not have Windows® Logo accreditation.

Select **Continue Anyway** to complete the installation.

The iView eXtreme4s can now be connected to a suitable USB 1.0 or 2.0 port using the cable supplied. At this point the hardware will be detected by Windows® as an eXtreme4s splitter, and a **New Hardware** wizard is displayed. Allow the wizard to search, and click on the recommended option to enable the previously installed driver to be associated with the new hardware.

Press **Continue Anyway** to accept the driver.

Running the eXtreme4s Control Application

To open the eXtreme4s Control application select **Start/All Programs/eXtreme4s Control**.

The application will search for an eXtreme4s connected to your computer and display the status of the first eXtreme4s detected. Should there be more than one eXtreme4s in use, a list of all available eXtreme4s's can be found in the File menu.

Once the application has detected an eXtreme4s the main status screen is displayed ***Fig.4.***

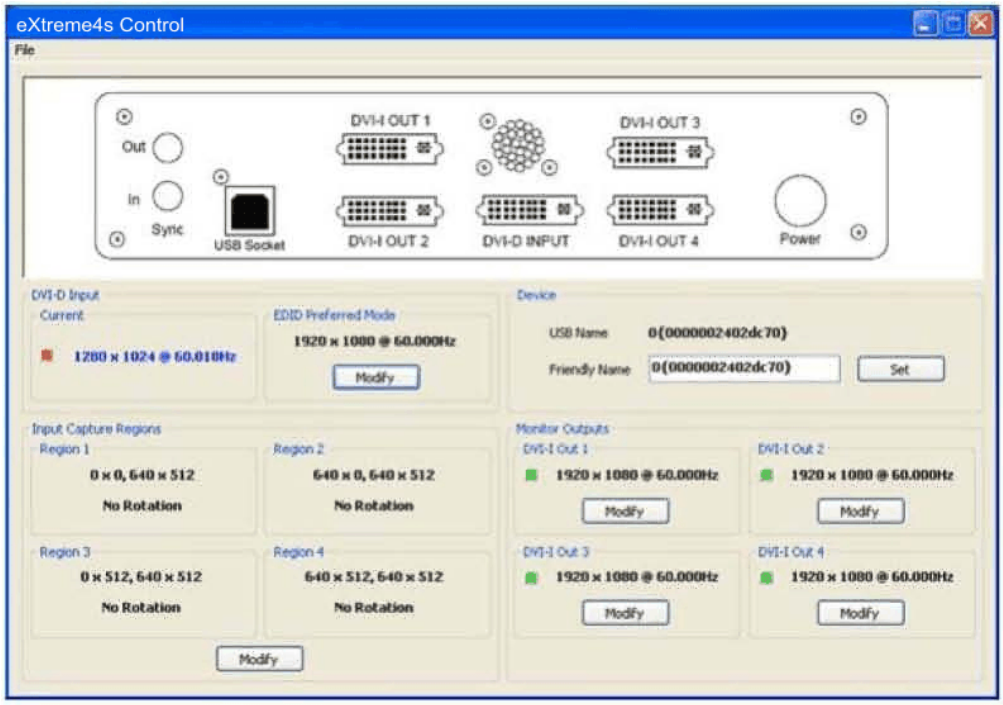


Fig.4

The main control dialog is divided into the following groups:

Connection Diagram

The connection diagram displays a schematic view of the rear panel of the eXtreme4s to assist in identifying the connectors.

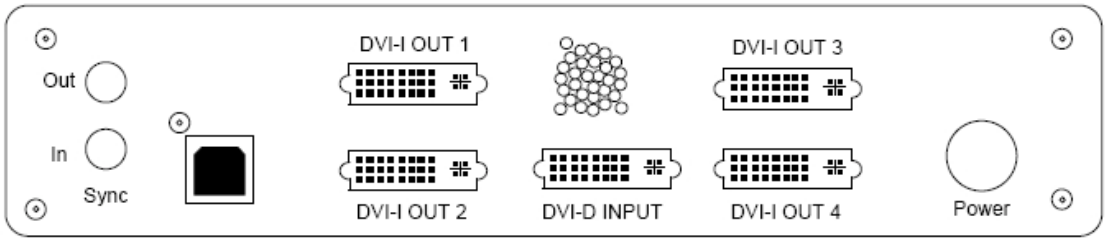


Fig.5

Device

The unique USB device name that is connected is displayed in the **Device** group. It is possible to associate a more user friendly name such as “First Four Outputs”. The friendly name is stored in non-volatile storage on the eXtreme4s and can to help identify the device during future configurations. Specific devices connected to your PC can be selected using the **Select Device..** command on the **File** Menu. The eXtreme4s’s will be listed by the USB Device or by a previously configured friendly name.

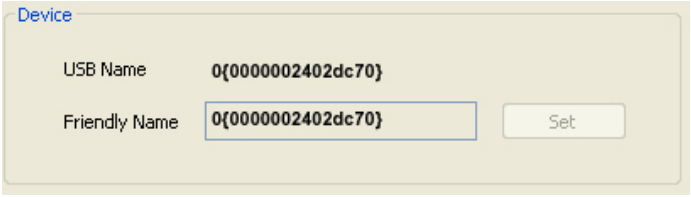


Fig. 6

DVI-D Input

The DVI-D Input group displays the current DVI mode that is being captured (if any) and the prefered mode that has been programmed into the eXtreme4s's EDID. Use the Modify button to update the EDID. The small square to the left of the current input resolution indicates whether the eXtreme4s has genlocked to the input source.

- Green – The outputs are genlocked to the input dot clock and vertical sync
- Red – the outputs are not genlocked

Fig.7

To change the timings of the input EDID click on the Modify button and the following dialog is displayed. ***Fig 8***.

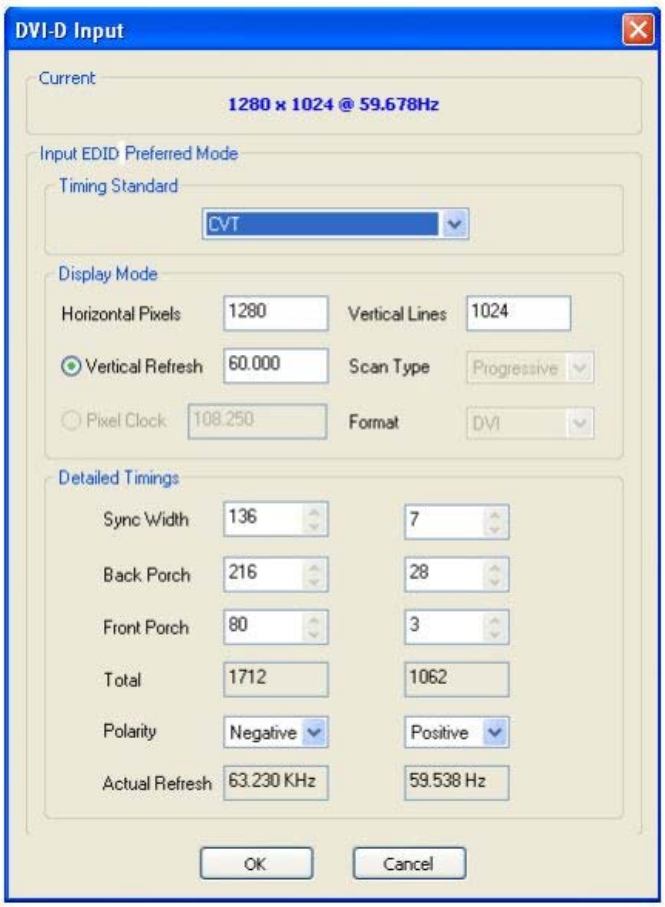


Fig.8

The DVI-D Input dialog displays the resolution of the current mode for reference and allows the timings of the EDID prefered mode to be edited. The dialog supports standard timing formulae such as:

- V ESA CVT
- CVT Reduced Blanking
- SMPTE (for HD modes)
- V ESA GTF
- Cu stom

Selecting Auto from the drop down list will typically default to the VESA CVT algorithm which best matches typical standard VESA output modes. However, to minimise dot clocks and hence maximise DVI cable lengths, the CVT Reduced Blanking is recommended.

Selecting Custom allows the timing parameters to be edited. It should be noted that you will need to select between definition of Pixel Clock or Vertical Refresh since these are mutually excusive parameters.

Once edited, clicking **OK** writes the prefered mode into the EDID but may not normally affect the input mode that is being captured. It may be necessary to force the graphics device in the host machine to detect the new modes, this can be done by selecting **Detect** on the Screen Resolutions dialog box (Windows® 7) or by disconnecting the souce from the eXtreme4s and reconnecting.

All modifications to the input settings can be save as a .vqs file, removing the requirement to input the same settings again. To save the settings select the **Save…** command in the **File** menu. To open a saved .vqs file select the **Open…** command.

Input Capture Regions

Each output of the eXtreme4s can select a different region of the input source image. This dialog
(***Fig. 9***) displays the settings of each region (region 1 corresponds to output 1 etc). The numbers denote the top, left, width and height coordinates of the region that is to be displayed. Note, these are described in terms of the current active input resolution. If the input resolution changes, the capture region coordinates scale to the new input resolution in order to maintain the same proportions.

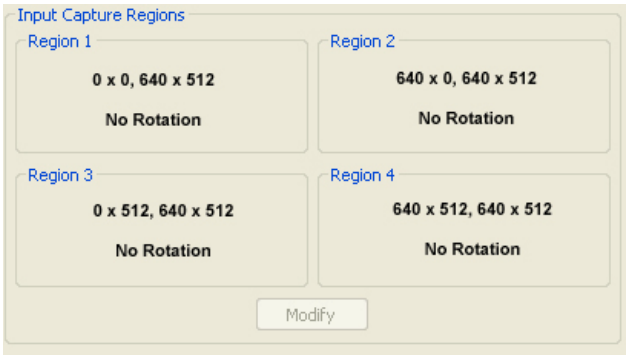


Fig. 9

To modify any of these settings click on **Modify** to display the edit dialog (***Fig. 10***)

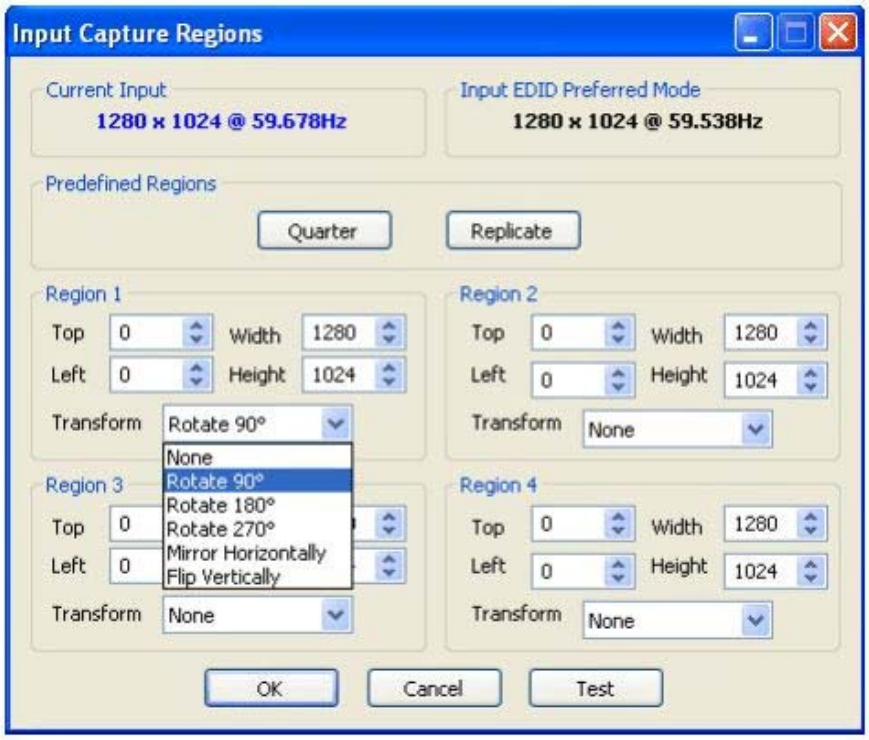


Fig. 10

Predifined Regions

For ease of use, there are preset buttons to select the two most popular configurations: **Quarter** or **Replicate**.

- Quarter

  The first monitor displays the top left hand corner of the input image, the second monitor the top right, the third the bottom left etc. This mode of operation can be used to drive four monitors in a 2x2 arrangement from a single high resolution input.

- Replic ate

  Each output displays the entire input image. The output monitors can be driven at the same resolution (with different timings if necessary) or a higher resolution.

There are no restrictions (other than the resulting scale factor must be 1:1 or upscale) in the region settings, so it is possible to have regions overlapping, or to program in gaps etc. Additionally each region can have a transform such as rotation or flipping applied to it (after cropping) in order to support different output monitor orientations.

Please note that there may be instances where a setting stored in non-volatile memory which was valid when it was stored (ie the scale factors from input to output were 1:1 or greater) may subsequently require down-scaling if the resolution of the input increases. In this case the firmware will adjust the scaling factors to give a 1:1 crop of the input, centred on the original region. In order to signal that at least one output is no longer exactly honouring the programmed region setting, the front panel status light will not be illuminated.

All modifications to the **Region** settings can be save as a .vqs file, removing the requirement to input the same settings again. To save the settings select the **Save…** command in the **File** menu. To open a saved .vqs file select the **Open…** command.

Monitor Outputs

The Monitor Outputs group shows the actual resolution and refresh rate that each of the four eXtreme4s outputs is currently providing. To see more information such as whether this is an analog RGB or DVI mode, if it is the monitor EDID preferred mode or a default mode programmed into the eXtreme4s, along with detailed timing information, click on the **Modify** button for the required output.

The genlock status is indicated by the small coloured squares:

- Green

  The outputs are genlocked to a common reference clock, and the Vsync of the first monitor. If the Input genlock light is green (see above), then the reference clock is taken from the input DVI source, and the system is fully genlocked to this source. If the input genlock indicator is red, then the outputs are genlocked together, but are not related to the input sync.

- Red

  The outputs are NOT genlocked

Fig.11

Individual monitor outputs can be configured by clicking on the corresponding **Modify** button. This will bring up a timing dialog similar to that of the input timings. This dialog is shown in ***Fig.12.***

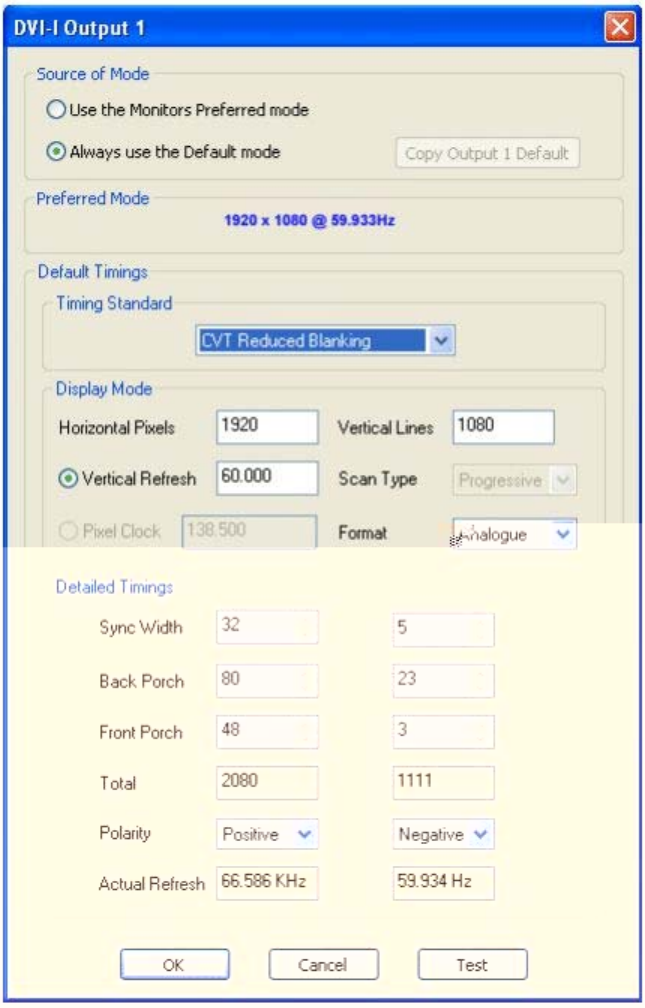


Fig.12

The source of mode selection controls whether the eXtreme4s output should take its timing values and resolution from the preferred mode of the monitor that is connected, or use its internally programmed 'default' mode. Please note that only the internal default timings can be edited in this dialog.

If **Use the Monitors Preferred Mode** is selected, but no valid EDID can be read from the attached monitor, then the eXtreme4s firmware will program the output to use the default mode timings.

The rest of the dialog is identical to that for setting the Input timings, with the exception that for the output monitors it is possible to select Analog RGB ("VGA") output as well as DVI.

All modifications to the **Output…** settings can be save as a .vqs file, removing the requirement to input the same settings again. To save the settings select the **Save…** command in the **File** menu. To open a saved .vqs file select the **Open…** command.

Finally there is a **Test** button which should be used when defining a default mode that you are not sure the attached monitor can support. In test mode, the output timings are programmed, but they are not saved to non-volatile memory on the eXtreme4s until the **OK** button is pressed to accept the mode.

Specification

eXtreme4s Physical Dimensions	235 x 175 x 44mm/9.25” x 6.9” x 1.75”
Operating Temperature Range	0 - 35 DegC/32 - 96 DegF
Power Requirements	5V DC, 11W. Universal mains power adapter supplied (100-240V)
Cooling	The unit contains a cooling fan. The input and output vents should not be restricted
USB 2.0	Full speed (12Mbits/s) operation supported
1 x Dual link DVI capture	To 330 Mpixels/s
Input Surface	4k x 4k maximum
4 x Single link DVI or analog RGB outputs	To 165Mpixels/s
Output Screens Resolutions	Up to 2.5Mpixel (maximum 2048 pixels in either direction)
Arbitary Up Scaling	64 x original surface area
Firmware Support	Updates supported via USB

iViewData Ltd

iView has a long and very successful history in the computer graphics industry since 1992. iView was one of the founding companies of multi-screen Windows acceleration using single and multi board solutions. Now using the very latest display technology iView offers some of the world's leading multi screen graphics accelerators for the most demanding applications.

As new technology advances, so we at iView improve the performance and functionality of both our hardware and software to give our customers more. Following a continuous development program, we pride ourselves on our support and responsive nature towards all our customers and their changing needs. As more sophisticated equipment and techniques become readily available, so we are there to exploit the power and potential that this technology presents.

Technical Support

Support page on the iView Web Site, usually with a response within 24 hours (excluding weekends).

http://www.iiview.com

Via Email:

Send an email to support@iiview.com with as much information about your system as possible. To enable a swift response we need to know the following details:

- Specification of the PC - including processor speed
- Operating System
- Application Software
- iView Hardware / Software
- The exact nature of the problem - and please be as specific as possible.

Please quote version and revision numbers of hardware and software in use wherever possible.

Copyright Statement

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